

TEXT-FIGURE 4.—Percent market share for low-tar cigarettes, 1967-76.

utable to the failure of smokers with emerging signs of clinical illness to seek medical attention until after quitting. Second, 10-15 years of cessation are required before the long-term smoker's risk approaches that of a nonsmoker. Therefore, at least this much time must elapse for a long-term smoker to receive maximum benefit from switching to lower tar cigarettes. This was our rationale for restricting the LTFS group to persons who had continuously smoked filter cigarettes for at least 10 years.

DISCUSSION

Whether calculated as a single summary estimate or as a dose-response curve, the data consistently point to reductions in risk for lung cancer and even larger reductions for larynx cancer risk among LTFS. As stated previously, the maximum risk reduction that a long-term smoker can expect is achieved only through complete cessation of smoking. One who switches from nonfilter to filter cigarettes must necessarily experience a more modest risk reduction than an ex-smoker over the same time period. Average tar levels of filter cigarettes have been about two-thirds those of nonfilter cigarettes for over a decade, and the tar levels for both have declined roughly in parallel; thus a 20-30% lowering in risk may reasonably be expected at the present time and was about what was observed.

The following is a discussion of current and future trends in cigarette composition and smoking behavior that may soon influence the expected patterns of tobacco-related cancers.

Cigarette Variables

Changes in tar levels with time.—When the first major epidemiologic studies linking lung cancer and cigarette smoking appeared in 1950 (5), the average cigarette yielded about 40 mg tar. Since that time, tar levels have fallen considerably. Text-figure 3 demonstrates that tar levels of both filter and nonfilter

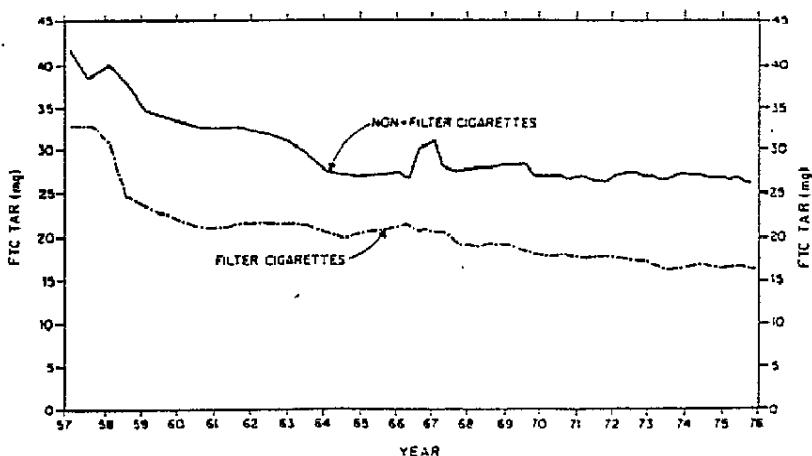
cigarettes continue to fall, and that even today's nonfilter cigarette produces one-third less tar than the nonfilter cigarette of a generation ago (20). This reduction in tar has occurred not only in the United States but throughout most of the world (10-12, 21-24), as shown in studies by Kuhn and Klus (25) in Austria, Todd in England (26), Ledez in France (personal communication), Timm in Germany (27), and Hoffmann in Canada (unpublished observations).

* *Changes in tar activity.*—Chemical and biological experiments have indicated that tars of present-day cigarettes have lower carcinogenicity per gram than tars of 25 years ago (4, 10, 11). This lowered activity, coupled with reduced total yield per cigarette, has undoubtedly contributed to a reduction in cancer risk in some populations, as observed in this and other studies (24).

Smoking Variables

Changes in filter cigarette consumption.—It is not sufficient that some of the available cigarettes become potentially less harmful in order to bring about a measurable lowering of disease incidence. Smokers must also switch to those cigarettes in preference to higher tar brands. This appears to be the trend. By 1976 nearly 90% of all cigarettes sold in the United States were filter brands (20, 24). The past 5 years have witnessed the emergence of low-tar (<15 mg) cigarettes, which have captured more than 16% of the market. This trend is illustrated in text-figure 4 in which the market share of all cigarettes yielding less than 15 mg tar is plotted for the 10-year period 1967-76. The growing usage of these cigarettes will probably have a continuing effect on reducing the average daily tar intake and concomitant disease risk.

Changes in lifetime tar consumption.—Our studies have not yet included persons who have smoked lower tar cigarettes exclusively. Text-figure 5 shows a model calculation of the proportion of a person's lifetime



Text-figure 3.—Sales-weighted average tar delivery of U.S. filter and nonfilter cigarettes, 1957-76. FTC=Federal Trade Commission.